

100-lbf Non-Toxic Storable Liquid Propulsion, Phase I

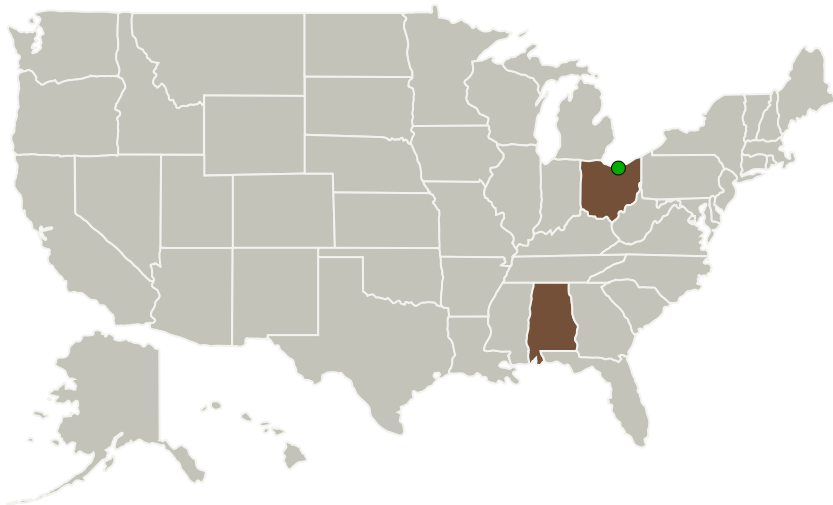
Completed Technology Project (2014 - 2014)



Project Introduction

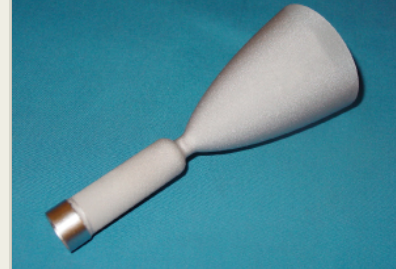
NASA's Road Maps for both Launch and In Space Propulsion call for the development of non-toxic, monopropellant reaction control systems to replace current state-of-art hydrazine. The Orion Multi-Purpose Crew Vehicle capsule with twelve 160 pound force (lbf) hydrazine monopropellant thrusters and the Orion Service Module with eight 100lbf NTO/MMH auxiliary propulsion thrusters are obvious insertion candidates. Additionally, the Commercial Crew and Cargo spacecraft have also demonstrated the need for 100lbf class attitude control thrusters with quantities comparable to Orion. Hydrazine replacements, including HAN- and ADN-monopropellants, combust at higher temperatures making them incompatible with current Inconel 625 thrusters used in 100lbf engines. In addition, Orion MPCV models indicate when current thrusters are fired during re-entry, the extra thermal loads of re-entry may exceed the operating envelope of Inconel. In support of NASA's goal to replace hydrazine and the need for higher performance 100lbf class engines, Plasma Processes proposes to design, fabricate and test a 100lbf thruster with emphasis on non-toxic propellant, increased performance, ease of manufacturing and cost reduction.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Plasma Processes Produced Thruster



100-lbf Non-Toxic Storable Liquid Propulsion Project Image

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations

Alabama

Ohio

Project Transitions

**June 2014:** Project Start**December 2014:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140532>)

Images



Project Image

100-lbf Non-Toxic Storable Liquid Propulsion Project Image
(<https://techport.nasa.gov/image/136674>)

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

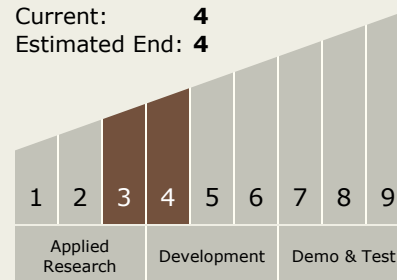
Timothy N Mckechnie

Co-Investigator:

Timothy Mckechnie

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX01 Propulsion Systems
 - TX01.1 Chemical Space Propulsion
 - TX01.1.2 Earth Storable

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Target Destinations

The Sun, Earth, The Moon,
Mars, Others Inside the Solar
System, Outside the Solar
System